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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/805,435

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Victor I. Klimov

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FISH & RICHARDSON P.C.

1425 K STREET, N.W.

11TH FLOOR

WASHINGTON, DC 20005-3500

EXAMINER

MENEFEE, JAMES A

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/805,435

Applicant(s)

KLIMOV ET AL.

Examiner

James A. Menefee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-66 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-66 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION***Response to Amendment***

In response to the amendment filed 12/10/2003, claims 1, 10-11, 14, 22-23, 29, 37, 42, 47-49, and 57 are amended. Claim 66 is added. Claims 1-66 are pending.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-66 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over **either** claims 1-31 of U.S. Patent No. 6,322,901 **or** claims 1-20 of U.S. Patent No. 6,207,229 in view of **either** Alivisatos et al. (US 5,537,000) **or** Kawasaki et al. (US 6,057,561). Although the conflicting claims are not identical, they are not patentably distinct. '901 and '229 are claiming a single nanocrystal, while the present invention is claiming a group of these same nanocrystals that are grouped together, forming a gain medium for use in a laser system. The nanocrystals claimed in '905 and '229 exhibit photoluminescence. Both Alivisatos and Kawasaki teach that it is well known that nanocrystals exhibiting photoluminescence are often grouped together into a gain medium and formed into a laser. It

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would have been obvious to one skilled in the art to make a laser gain material out of nanocrystals as they provide improved optical output at a variety of wavelengths, as taught by Alivisatos and Kawasaki.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 9-12, 14-17, 21-25, 28-32, 37-39, 42-44, 47-50, 53-54, 57, 59-62, and 66 are rejected under 35 U.S.C. 102(b) as being anticipated by Alivisatos et al. (US 5,537,000, previously cited by applicant). Alivisatos discloses the following:

Independent Claims:

Regarding claims 1 and 57 and 66, Alivisatos discloses a gain medium comprising a concentrated solid 30 including a plurality of semiconductor nanocrystals 32, the nanocrystals being closely packed. The solid is substantially free of defects.

Regarding claims 14, 23, and 43, the only structural limitations are a gain medium comprising a concentrated solid including a plurality of semiconductor nanocrystals, the nanocrystals being closely packed. Apparatus claims must be distinguished from the prior art in terms of structure rather than function. "[A]pparatus claims cover what a device is, not what a

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device does.” *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). In this case, there is no structural support in the claims that the solid “provides gain” as claimed. If the applicant wishes to distinguish from the prior art using these limitations, then some structure that will necessarily perform these functions must be claimed.

Regarding claims 30, 38, and 53, there is further a cavity, or microcavity, arranged relative to the gain medium to provide optical feedback.

Regarding claim 43, the solid further provides gain to a signal at an energy equal to or less than the maximum band gap emission of the nanocrystals.

Regarding claims 48-49, the claims combine the limitations of other independent claims, and thus are disclosed as above.

Dependent Claims:

Regarding claims 2-3 and 60, the solid is very closely packed at greater than 10% by volume of nanocrystals.

Regarding claims 4, 16, 24, 39, 44, 50, 54, and 61, the nanocrystals are made of a II-VI or III-V compound material.

Regarding claims 5, 17, 25, and 62, the nanocrystals are disclosed to be made of materials as claimed.

Regarding claims 9, 21, and 28, each nanocrystal may have a diameter less than about 10 nanometers.

Regarding claims 10, 22, 29, 37, 42, and 47, the nanocrystals have a uniform, and thus monodisperse, distribution of sizes.

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Regarding claim 11, the solid may include layers of different nanocrystals 34 having a different size, thus a plurality of monodisperse distributions are disclosed.

Regarding claims 12, the nanocrystals are disposed on a substrate.

Regarding claim 15, see the rejection of claim 14 above.

Regarding claim 31, the solid is substantially free of defects.

Regarding claim 32, there is further an excitation source.

Regarding claim 59, the gain medium is substantially free of host material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alivisatos.

Regarding claim 33, Alivisatos does not disclose that the system is optically excited. However, it is well known in the art that the electrical excitation described therein may be replaced by optical excitation. It is so well known that an entire U.S. classification subclass, 372/70, is devoted to this subject. It would have been obvious to one skilled in the art to replace the electrical excitation with optical excitation as a matter of engineering design choice because the two types of pumping are very well known and often interchangeable, as is known in the art.

Regarding claim 34, the rejection is disclosed as in the rejection of claim 4 above.

Response to Arguments

Applicant's arguments filed 12/10/2003 have been fully considered but they are not persuasive.

Regarding the double patenting rejections:

Applicant argues that the claims of the '901 or '229 patents do not suggest forming a concentrated solid of nanocrystals that are closely packed. This is remedied by the Alivisatos and Kawasaki references.

Applicant argues that Alivisatos does not teach a gain medium. This argument is not persuasive. The layer produces light in response to a voltage input, and thus may be characterized as an active medium, or gain medium.

Applicant argues that Alivisatos' nanocrystals are not close-packed as claimed. This is not persuasive. First, the term "close-packed" must be given its broadest reasonable interpretation. Even though Alivisatos does not explicitly state that the nanocrystals are "close-packed" looking at Figs. 6-8 one can see all of the nanocrystals 32 touching each other. This can be reasonably construed as close-packed. Further, Alivisatos incorporates by reference the teachings of Alivisatos et al. (US 5,262,357, previously cited) to show how the nanocrystals are formed. In col. 4 lines 3-6 of Alivisatos '357, it is disclosed that the layers of nanocrystals are "contiguous" and the nanocrystals must be "touching one another." Without any further definition of "close-packed", these interpretations suffice and Alivisatos does indeed show the nanocrystals are "close-packed".

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Applicant argues that Alivisatos' nanocrystals do not have an rms deviation less than 15%. Alivisatos is used in this rejection to teach that a plurality of the crystals claimed in '901 or '229 may be formed into a concentrated solid. The rms deviation of the particular crystals is claimed in '901 claims 7-8 and '229 claim 20. Alivisatos is not used to show the feature of rms deviation as it is already present in the base references.

Further, the Examiner contends that Alivisatos does meet this rms deviation limitation. Alivisatos discloses that the nanocrystals are "all the same size" (see col. 8 ~line 51). Further, going again to the teachings of Alivisatos '357, col. 5 lines 15-16 of '357 discloses that for a given embodiment the variation in size of diameter is $\pm 3\%$. Each of this implicitly disclose an rms deviation of diameter of less than 15%.

Applicant argues that Kawasaki teaches the deviation in diameter of the size of the crystals is 37%, where applicant claimed such feature as less than 15%. This argument is not persuasive. Kawasaki is used in this rejection to teach that a plurality of the crystals claimed in '901 or '229 may be formed into a concentrated solid. The rms deviation of the particular crystals is claimed in '901 claims 7-8 and '229 claim 20. Kawasaki is not used to show the feature of rms deviation as it is already present in the base references.

Regarding the 35 U.S.C. §§ 102 and 103 rejections based on Alivisatos:

The arguments against Alivisatos are the same as those addressed above in regards to the double patenting rejection.

Regarding the 35 U.S.C. §§ 102 and 103 rejections based on Kawasaki:

These arguments are persuasive, as Kawasaki teaches away from the rms deviation being less than 15%.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (571) 272-1941. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JM
January 23, 2004



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